

Exceptional service in the national interest



Sandia's Nuclear Weapons Mission

Ensuring that the nation's stockpile is safe, secure and effective, and that it meets military requirements

America's Nuclear Weapons Systems Engineering Laboratory

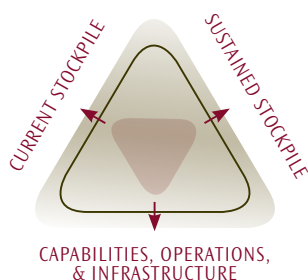
Sandia is responsible for all non-nuclear components of the nuclear explosive package to create a militarily effective and logistically sustainable U.S. nuclear deterrent. The nation's nuclear weapons meet the highest reliability requirements: they must always work when needed and authorized. They must meet equally stringent safety and security requirements: they must never work when not authorized. Nuclear weapons must survive extremely complex and often harsh environments. They must remain dormant for up to 30 years, yet be immediately available when they are on high alert-readiness levels. The utmost confidence in the nuclear weapons enterprise is required for presidential command and control. These challenges require systems engineering underpinned by deep science along with demonstrated product delivery. The foundation of Sandia's work is science-based engineering, in which fundamental science, computer models and unique experimental facilities come together to enable researchers to understand, predict and verify weapon systems performance. People are Sandia's most important resource and are the key to mission success, as they have been for 60 years of U.S. nuclear deterrence, from the Manhattan Project of World War II, through the Cold War and now in the challenging era of stockpile modernization. As a Federally Funded Research and Development Center (FFRDC), Sandia is one of a select group of institutions that focus science, technology, systems analysis and engineering expertise on pressing national security challenges.

Sandia's Role in Stockpile Readiness and Assessment

Within the U.S. nuclear weapons enterprise, Sandia is responsible for nuclear weapon systems and components from their original design

through final dismantlement and disposition. Sandia's nuclear weapons mission is focused on three imperatives:

- maintain the U.S. stockpile through surveillance and the exchange of weapon components that have limited life;



"...I view this not solely as an individual letter but as a statement of institutional excellence and commitment to our nation's security."

— **Paul Hommert**
*President and
Laboratories Director*

- sustain the stockpile into the future through Life Extension Programs and Alterations; and
- maintain and advance Sandia's required engineering and science capabilities, operations and infrastructure to ensure the health and vitality of Sandia's nuclear weapons mission.

Sandia evaluates the reliability and safety of every active stockpile weapon type on an annual basis, and documents its findings in a letter from the laboratory director to the Energy and Defense Secretaries.

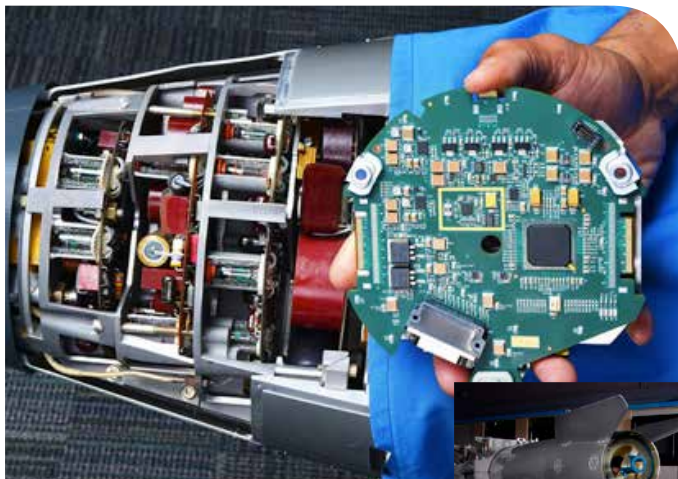


Reports from all three weapons lab directors, along with the assessment from the commander of the U.S. Strategic Command, form the basis for the formal report to the President of the United States on the overall condition of the stockpile. This year's Sandia message concerning the U.S. nuclear weapons stockpile is that it is currently safe, secure and effective, with known aging issues that must be addressed.

Sandia's Nuclear Weapons Products and Essential Capabilities

At the core of Sandia's nuclear weapons program are these key elements of weaponization:

- Warhead systems engineering and integration;
- Arming, fuzing and firing systems;
- Neutron generators to initiate nuclear fission;
- Gas transfer systems; and
- Safety and surety systems.



These supporting science and engineering capabilities underpin Sandia's nuclear weapons program:

- Environmental testing
- Materials science
- Microelectronics and microsystems
- Engineering sciences
- Computational simulation
- Radiation effects sciences

While nuclear weapons represent Sandia's core mission, the science, technology, engineering, systems analysis and program management required for this mission enable other key national security missions. At the same time, the nuclear weapons enterprise benefits from strong programs in other national

security areas and fundamental research. Examples include:

- developing tools for the warfighter to safely disable Improved Explosive Devices, made possible by the deep expertise in explosives required for our nuclear weapons mission;
- benefits from global monitoring systems for nuclear material detection; and
- cyber defense applications based on Sandia's long-standing work in the command and control of nuclear weapons.

A Special Mission in Safety and Surety

Ensuring the safety and security of the stockpile is a key mission for Sandia. Surety originates in the engineering of fundamental, science-based design principles and architectures. Nuclear weapons are designed to be safe in all environments. Science-based principles underpin the design of the safety subsystems that prevent energy from reaching the nuclear explosive components through physical barriers, unique energy requirements that require compatibility for activation, and systems that become inoperable in an accident.

Weapon security relies upon denying adversaries access to the weapon and its internal features so that the weapon cannot be detonated. Formidable physical security systems provided by the military and the Department of Energy's National Nuclear Security Administration (NNSA) deter adversaries. Sandia applies nuclear weapon design principles to achieve assured security in all situations, regardless of changing threats.



Evolving Policy Landscape

President Barack Obama outlined his vision for reducing the role of nuclear weapons in the national security strategy in Prague (2009) and Berlin (2013). He says the U.S. should continue to lead international efforts to reduce nuclear arsenals, prevent nuclear proliferation and secure nuclear materials, and appropriately size nuclear forces that still play an essential role in protecting U.S. and allied security interests. His vision was spelled out in the Nuclear Posture Review of 2010, and subsequent detailed plans developed by the NNSA and the Department of Defense. The New START Treaty solidifies the

nation's commitment to a smaller nuclear arsenal, which increases the importance of an effective deterrent. Sandia is instrumental in maintaining the health of the stockpile, including its life extensions, the underlying infrastructure, science and engineering capabilities, and an expert workforce.



Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000. SAND No. 2014-0698P. MV.

